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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/604,735	08/13/2003	Julie P. Harmon	1372.25.PRC	1734

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SMITH & HOPEN PA
15950 BAY VISTA DRIVE
SUITE 220
CLEARWATER, FL 33760

EXAMINER
VIJAYAKUMAR, KALLAMBELLA M

ART UNIT	PAPER NUMBER
1751	

DATE MAILED: 10/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/604,735	HARMON ET AL.	
	Examiner	Art Unit	
	Kallambella Vijayakumar	1751	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 August 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *19-22* is/are allowed.

6)☒ Claim(s) *1-9, 16-18, 23-24* is/are rejected.

7)☒ Claim(s) *10 and 11* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claims 1-24 are currently pending with the application.

The information disclosure statement (IDS) submitted on 11/17/2003 has been considered by the examiner.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

1. Claims 1-2, 9, 12-13, 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reynolds (US 2002/0197474).

The prior art teaches a method of making CNT/polymer composite by (a) dispersing CNT in a mixture of polyamic acid and 4,4'-oxydianiline (ODA), (b) adding 3,3', 4,4'-benzophenonotetracarboxylic anhydride in N,N'-dimethylformamide (BTDA), and (c). stirr the mixture mechanically under vacuum until no longer exothermic. The polyamic-acid/CNT was slurried/dissolved in N-methylpyrrolidone or dimethylacetamide, extruded, rinsed with water followed by isopropanol wash, and heat treated at 300°C forming polyamide/CNT composite (Page-5, Para 0061-0062).

The prior art is silent about deinhibiting the monomer per claim-1, bubbling N2 through the dispersion per claim-12, and removal of solvent per claim-18.

It would be obvious to a person of ordinary skill in the art to deinhibit the monomer before polymerization, and optionally substitute the vacuum processing of the composite with an inert blanket/atmosphere of N2 as functional equivalent of non-oxidizing atmosphere with reasonable expectation of success, because these are common procedures in the art.

2. Claims 1-2, 4-5, 8-9, 12-13, 17-18 and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jia et al (Mat. Sci. Eng. 1999, A271, 395-400).

Jia et al teach adding 1 wt% CNT and 0.12 wt% AIBN to methylmethacrylate (MMA), mix the contents, polymerize to form the composite. The prior art further teaches mixing MMA, AIBN and treated CNT into toluene, stir for 1.5 hrs at 358K and coat on a film of polyethylene and volatilize toluene forming the sheet.

The prior art is silent about the deinhibiting the monomer per claim-1, bubbling N2 per claim-12 and a transparent composite per claims 23-24.

It would be obvious to a person of ordinary skill in the art at the time of the disclosure of the invention by the applicants to deinhibit the monomer before polymerization, and carryout the polymerization in an inert atmosphere of N2 or Ar with reasonable expectation of success, because these are common procedures in the art.

With regard to claims 23-24, the prior art teaches CNT/PMMS sheets/films whose composition is similar to that by the applicants, and similar compositions are expected to have similar properties. When

the reference teaches a product that appears to be the same as, or an obvious variant of, the product set forth in a product-by-process claim although produced by a different process, the claim is not patentable. See In re Marosi, 710 F.2d 799, 218 USPQ 289 (Fed. Cir. 1983) And In re Thorpe, 777 F.2d 695, 227 USPQ 964 (Fed. Cir. 1985). See also MPEP §2113.

3. Claims 3, 7, 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reynolds (US 2002/0197474) in view of Smalley et al (US 2002/0048632) and Shibuta et al (US 5,908,585).

The disclosure on the making of CNT/polymer composites by Reynolds et al as set forth in rejection-1 under 35 USC 103(a) is herein incorporated.

The prior art is silent about the use of SWNT in the composite per claim-3, ultrasonic per claim-7, use of methylene chloride per claims 14-15 and filtration per claim-16.

In the analogous art Smalley et al teach forming SWNT/PMMA composites with high dielectric constant by: (a) adding 0.01-0.5 wt% SWNT, 1-5 wt% polymer and optionally a surfactant to a solvent, wherein the addition of the components could be either simultaneous or sequential, (b). dispersing the mixture by a combination of mixer, shear-mix and ultrasonic, (c). removal of the solvent by centrifugation and isolating solids, and (d). redispersion of the composite solids in a solvent (Abstract, Page-6, Para 0047-0050; Page-7, Para 0055, 0059).

In the analogous art Shibuta et al teach forming carbon fibril/polymer composites by solvent casting of a mixture of fibrils/oxide/polymer/monomer using methylene chloride (Col-5, Ln 40-50; Col-6, Ln 17-22).

It would have been obvious to a person of ordinary skill in the art to combine the prior art teachings by optionally including SWNT in the composite to benefit from high electrical, mechanical and optical properties, and/or optionally substitute mixing with ultrasonic and/or shear as functional equivalent and/or optionally substitute the solvent with methylene chloride as functional equivalent and/or separate the solids from the excess monomer by filtration/centrifugation as desired by the process design, with reasonable expectation of success because the combined prior art teaching is suggestive of the claimed process steps/method. See also In re Burhans, 154 F.2d 690, 69 USPQ 330 (CCPA 1946) (selection of

any order of performing process steps is prima facie obvious in the absence of new or unexpected results).

4. Claim 3, 7, 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jia et al (Mat. Sci. Eng. 1999,A271, 395-400) in view of Smalley et al (US 2002/0048632) and Shibuta et al (US 5,908,585).

The disclosure on the making of CNT/polymer composites by Jia et al as set forth in rejection under 35 USC 103(a) are herein incorporated.

The prior art are silent about the use of SWNT in the composite per claim-3, ultrasonic per claim-7, use of methylene chloride per claims 14-15 and filtration per claim-16.

In the analogous art Smalley et al teach forming SWNT/PMMA composites with high dielectric constant by: (a) adding 0.01-0.5 wt% SWNT, 1-5 wt% polymer and optionally a surfactant to a solvent, wherein the addition of the components could be either simultaneous or sequential, (b). dispersing the mixture by a combination of mixer, shear-mix and ultrasonic, (c). removal of the solvent by centrifugation and isolating solids, and (d). redispersion of the composite solids in a solvent (Abstract, Page-6, Para 0047-0050; Page-7, Para 0055, 0059).

In the analogous art Shibuta et al teach forming carbon fibril/polymer composites by solvent casting of a mixture of fibrils/oxide/polymer/monomer using methylene chloride (Col-5, Ln 40-50; Col-6, Ln 17-22).

It would have been obvious to a person of ordinary skill in the art to combine the prior art teachings by optionally including SWNT in the composite to benefit from high electrical, mechanical and optical properties, and/or optionally substitute mixing with ultrasonic and/or shear as functional equivalent and/or optionally substitute the solvent with methylene chloride as functional equivalent and/or separate the solids from the excess monomer by filtration/centrifugation as desired by the process design, with reasonable expectation of success because the combined prior art teaching is suggestive of the claimed process steps/method. See also In re Burhans, 154 F.2d 690, 69 USPQ 330 (CCPA 1946) (selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results).

Allowable Subject Matter

Claims 19-22 are allowed.

Claims 6, 10-11 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art of record neither teaches nor fairly suggest a method of making the polymer-CNT composite by the specific process steps having the specific components of the applicants.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Connell et al (US 2003/0158323), Plenkowski et al (US 2002/0001620).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kallambella Vijayakumar whose telephone number is 571-272-1324. The examiner can normally be reached on 8-5.30 Mon-Thu, 8-4.30 Alt Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yogendra Gupta can be reached on 571-272-1316. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KMV
October 01, 2005.

Mark Kopec
Primary Examiner